

USAID Evaluation Highlight No. 29
June 1994
Protecting Biological Diversity in Sri Lanka

Document Order No. PN-ABG-044

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Summary

The island nation of Sri Lanka is a rich reservoir of plant and animal species, including several found nowhere else in the world and many that are yet to be classified and inventoried. Sri Lanka has greater biological diversity per unit area than any other country in Asia. But over the last two decades, unregulated development schemes have encroached on some of the habitats that sustain much of the country's unique wildlife, threatening it with destruction. In 1980, the National Academy of Sciences Committee on Research Priorities in Tropical Biology identified Sri Lanka as one of 11 countries worldwide requiring special attention.

In the early 1970s, with international donor support, the Sri Lankan Government began developing the Mahaweli river basin irrigation system. The World Bank and other donors financed much of the system's infrastructure (roads, canals, reservoirs, and hydroelectric power), while USAID supported the Government's efforts to improve farm production systems within the newly irrigated lands. But along with improvements in farm production and increased hydroelectric power, the Mahaweli system radically changed the surrounding habitats that fostered much of Sri Lanka's diverse plant and wildlife.

With most lowland areas taken up for water storage or irrigated agriculture, wildlife were forced to retreat to hilly upland areas that were already at their carrying capacity for wild animal species. These forested areas were also becoming degraded by the growing rural populations within the Mahaweli scheme.

In 1982 USAID launched the 10-year, \$5 million, Mahaweli Environment Project (MEP) to help the Sri Lankan Government create and manage a system of protected wildlife parks and sanctuaries within the scheme. MEP sought to halt expansion of crop cultivation, animal grazing, logging, and hunting in these remaining forest habitats and prevent further loss of the country's irreplaceable biological resources.

In 1993 the Center for Development Information and Evaluation (CDIE) completed an evaluation of Sri Lanka's experience with protected area development and management as part of a worldwide assessment of USAID-assisted biological diversity protection programs. The assessment also examined programs in Costa Rica,

Jamaica, Madagascar, Nepal, and Thailand.

The results of the Sri Lanka evaluation, summarized in this highlights, indicate that USAID support led to the formal establishment of protected habitats. However, the evaluation revealed that the capabilities of Sri Lankan agencies in managing the newly demarcated parks and sanctuaries have lagged behind what is required to ensure the sustainability of the biologically diverse flora and fauna.

Properly managed habitat protection in Sri Lanka is a win-win solution in which the environment and development both gain. Mahaweli's forests, for example, provide habitat for wildlife and protect watersheds for the irrigation and power systems. But the Mahaweli scheme is gradually drifting toward a lose-lose situation. As forests become fragmented and degraded, species are lost and the country's sustained economic growth is threatened. Moreover, efforts to protect forest habitats and watersheds are having little effect in changing this course because they are addressing the symptoms, not the causes, of habitat destruction.

Background

Between 1965 and 1968 the Government of Sri Lanka, with U.N. assistance, developed a master plan for the use of the island's largest river system, the Mahaweli Ganga. The Accelerated Mahaweli Development Program (AMDP) is a 30-year, multiphased area development effort to construct 20 large reservoirs to provide sufficient water and electric power to nearly half a million hectares of newly irrigated agricultural land and to meet the needs of a rural population of nearly 2 million people.

By the mid-1980s AMDP had brought an estimated 127,000 hectares of land under cultivation and resettled more than 400,000 people. But the economic and social benefits created by the Mahaweli river basin development scheme also had environmental costs. Extensive natural forests were cleared for irrigated crop cultivation. Other forest habitats were submerged by reservoirs that now supplied water for the irrigation system and hydroelectric facilities. New roads, settlements, and earthworks were distributed throughout the Mahaweli scheme, leaving only scattered remnants of natural, old-growth forests, savannas, and wetlands as habitats for the area's plant and animal wildlife.

The remaining Mahaweli forests now provide the only habitats for a range of plants and animals, including several endangered species endemic to Sri Lanka. Biological surveys in the early 1980s identified 42 vertebrates and 70 plants in Sri Lanka now on international lists of endangered species.

Protecting Mahaweli's remaining forests is important not only for maintaining biological diversity but also for continuing economic development in the area. The Mahaweli system supplies the water for irrigation and hydroelectric power for the region. But the capacity of some of the Mahaweli reservoirs and irrigation systems has already been reduced by siltation from soil runoff where forest

cover has been removed for farming and urban development.

USAID's Assistance Approach

USAID was among the first foreign donors to assist Sri Lanka in addressing the environmental impacts of Mahaweli development. The 10-year, \$5 million Mahaweli Environmental Project (MEP) (with \$1.9 million additional funding provided by the Sri Lankan Government) operated between 1982 and 1991. It responded directly to an earlier USAID-sponsored environmental impact assessment that had examined the potential adverse effects of extensive irrigation development and had suggested mitigating measures.

MEP sought to reduce the adverse impact of development on the Mahaweli region's plant and animal life by setting aside officially protected areas and strengthening the Department of Wildlife Conservation's (DWLC) park planning and management capabilities. MEP aimed at supporting a more systematic approach to forest habitat and wildlife conservation that included the following:

Demarcating national park boundaries and improving park infrastructure and facilities

Developing DWLC's research and training capabilities for planning and managing protected areas

Establishing a wildlife trust to fund special initiatives for protecting biological diversity

Although MEP ended in 1991, USAID has continued to support the conservation of biological diversity through subsequent initiatives. In 1990, USAID launched a \$12 million Natural Resources and Environmental Policy Project, which broadens Agency support to include intergovernmental environmental units, nongovernmental organizations (NGOs), environmental impact assessments, and forest and marine wildlife protection in Sri Lanka.

Findings

MEP is one of USAID's earliest efforts to include conservation of biological diversity in a rural development program. Findings from the Sri Lanka field evaluation offer insights into how such efforts can be improved for greater impact.

Program Implementation

MEP has helped the Sri Lankan Government establish seven protected areas demarcated with publicly recognized borders an important first step toward the conservation of Sri Lanka's biological diversity. The new areas constitute about 30 percent of Sri Lanka's existing protected lands and nearly 45 percent of the Mahaweli Basin. CDIE evaluators traveled to the largest of the newly protected areas, the Madura Oya National Park.

The Maduru Oya along with the other newly designated parks and

reserves has been gazetted and demarcated, and park staff have been hired and trained. As a result, clearly labelled signboards in Sinhalese and English are posted on all access roads approaching the park and visitor permits are issued at the park's northern boundary. Interviews with villagers in the buffer zone, traditional subsistence cultivators, and tribal group members along the park's southern boundary revealed a new local awareness of the park's borders and fewer cases of destructive hunting and farming practices inside the park.

However, the evaluators found little evidence of active resource management or park monitoring prerequisites for ensuring the conservation of the resident flora and fauna. At Maduru Oya Park there is no evidence of such standard habitat management practices as assisting natural regeneration of areas degraded by earlier human habitation or monitoring wildlife habitat requirements and species populations. DWLC appears to focus largely on discouraging illegal encroachment.

MEP has heightened government awareness and expanded logistical capacity for managing protected areas, but responsible agencies have yet to organize and train themselves to operate a viable forest habitat protection system. DWLC and the Mahaweli Authority of Sri Lanka (MASL), which oversees AMDP operations, are both part of the Ministry of Forestry, Irrigation, and Mahaweli Development. However, the evaluation found little evidence of coordinated planning or implementation between the two agencies in the Mahaweli area.

As a result, the status and needs of Maduru Oya and other parks in the Mahaweli system are not well defined in national forest habitat protection strategies. For example, with MEP support, the Sri Lankan Government has set up Maduru Oya as a typical park for recreational tourism, but it is doubtful that such a role is appropriate for the park. Recreational tourism might best be limited to those parks and sanctuaries with more established plant and wildlife populations, where staff resources are adequate to monitor tourism and physical facilities are sufficiently developed to handle large numbers of visitors.

Protected areas and parks like Maduru Oya are new to Sri Lanka. These areas are still healing from the environmental degradation brought on by previous human settlements inside their borders, and their plant and wildlife populations need systematic management and monitoring by trained naturalists to regenerate. Rather than establishing them as recreational tourist areas, the Government might consider placing them off limits to tourism until habitats have regenerated and wildlife have reached former population levels.

Data are insufficient for the effective planning and management of protected areas. The evaluation found little evidence to indicate that new physical facilities, improved training, and additional staff have led to any efforts by DWLC to collect scientific information on forest vegetative type and associated wildlife feeding and breeding requirements, population dynamics, migration

and dispersal patterns, and external threats from human encroachment. These data are essential in ensuring that forest habitats are of sufficient size and quality to maintain wildlife populations at viable levels.

Evaluators learned that only two modest research grants in 1993 funded studies on habitats and wildlife in the park area, and no DWLC research was planned or underway. With field data that are two decades old, there is no way of knowing how plant and animal populations have changed since the park was demarcated, and DWLC has no basis for determining how it might rehabilitate the protected areas.

The Sri Lankan Government has yet to develop a scientifically based national land use policy to guide forest habitat protection and wildlife conservation within the Mahaweli system. In June 1990, the Sri Lankan cabinet approved a new National Policy for Wildlife Conservation. Policies for protected areas called for the following:

Performance objectives for each gazetted protected area

Mechanisms enabling existing and proposed protected areas to meet these objectives

A stated goal of sustainable resource use that is compatible with these objectives

Effective management of protected areas to maintain biological resources at natural levels

DWLC proposed incorporating these policies into a conservation act with sufficient flexibility to permit a variety of conservation practices, but such legislation had yet to be enacted at the end of 1993. Within the AMDP there is no multidisciplinary approach to land use and conservation that could integrate area development with sustainable use of natural forest habitats.

Nongovernmental organizations (NGOs) have only recently become involved in protecting forest habitats. During much of the period of MEP implementation, the political and security conditions in Sri Lanka were too volatile to allow USAID to work with any organization other than government institutions. Interviews with government officials revealed that the Government considered environmental NGOs to have played more of a confrontational role rather than a cooperative role in the past.

Near the end of MEP implementation the Sri Lankan Government endorsed the use of \$500,000 of MEP funds to set up an autonomous NGO a trust to finance research, public education, and professional training in forest habitat protection and wildlife conservation. The Wildlife Trust was registered as a charitable institution free to receive private contributions and make funding decisions independent of government or donor influence.

As configured, the Trust falls short of its goals in part because

its charter allows the head of DWLC, a political appointee, to chair the Trust's Board of Directors, in effect handing control to the Sri Lankan Government. To date the Trust has not acquired the independence and flexibility envisioned for it at its inception (see Box 1).

Program Impact

The most visible impact of USAID support for Sri Lanka's habitat protection is the halt in human settlement and agricultural cultivation within newly designated protected areas. The evaluation confirmed that human settlements have been abandoned within Maduru Oya National Park and reportedly within other protected areas demarcated in the AMDP system. Many former park dwellers have been resettled onto AMDP irrigated farm homesteads.

Farmers who continue to cultivate in unirrigated border areas reported knowing the penalties for illegal encroachment in the park. The presence of signs, buildings, and staff at all road entrances to the park appear to be discouraging encroachment. Illegal practices within the park, such as slash-and-burn cultivation, hunting, poaching, and domestic cattle grazing, are becoming less frequent according to park guards.

Habitats in Maduru Oya National Park are in various stages of natural regeneration. Although formerly cultivated and cleared areas are now regenerating, the habitats of several wildlife climax species, such as the Asian wild elephant and muntjac deer, are not yet optimal.

Several exotic invader plant species, some probably inadvertently imported by former settlers, appear to have established a foothold, competing with the indigenous flora and fauna. As a result, some resident wildlife have been forced onto agricultural areas bordering the park in search of food or breeding grounds. Elephants, wild boar, leopards, and wild buffalo invade peripheral settled areas, destroying crops, killing livestock, and damaging dwellings. Conflicts between farmers and wildlife are almost a daily occurrence. DWLC has not attempted to accelerate or direct natural habitat restoration to ameliorate such conflicts. It has instead chosen to address the symptoms by installing chain-link fences, organizing elephant roundups, and carrying out other wildlife repellent measures.

The establishment of national parks and protected areas has been accompanied by the fragmentation of remaining forests into "island habitats" surrounded by commercial agriculture and rural population settlements. This fragmentation has created serious problems not yet addressed by protection measures.

Sri Lanka's national protected areas represent 12 percent of its total land area, more than twice that of the global average of 5 percent and exceeding the 10 percent set aside in the United States. However, many protected areas are degraded, isolated, and too small to support some populations in sufficient numbers to ensure their long-term survival. Moreover, most of the country's 67

protected areas are fragmented into "biological islands" surrounded by commercial agriculture and rural settlements with no corridors for wildlife to use to move among areas. Without such corridors to provide access to the full spectrum of habitat types, the feeding and breeding requirements of many species will not be met and Sri Lanka's biological diversity will not be maintained.

Most Mahaweli forest habitats are in the upland dry zones where many animal species migrated after the Mahaweli scheme was developed. In the dry zones, the animals face seasonal shortages of water and vegetation in often degraded settings inferior to where they lived before. Wildlife populations have therefore begun to fall far below levels considered necessary to ensure the genetic diversity required for species viability.

Conservation biologists estimate that Sri Lanka's wild elephant population must remain above 1,000 to retain sufficient genetic diversity for species survival. By some estimates, wild elephants require 10 square kilometers of land per animal for feeding and breeding. Based on this estimate, the elephants will need a minimum habitat area of about 10,000 square kilometers for species survival, more if habitat quality is inferior because of seasonal food or water shortages. But among the country's 67 protected areas only three are more than 500 square kilometers. Forest fragmentation is threatening many other animal species with extinction as well among them predatory cats, migratory ungulates, and some bird species (see Box 2).

The immediate overall socioeconomic impact of resettling park dwellers to areas outside the park is positive but presents potential problems for future generations. More than 1,500 families were living inside the Maduru Oya Park boundaries at the time park lands were demarcated. The area contained numerous small villages with roads, schools, temples, and permanent housing. Relocation of families to areas outside the park began in 1982 and ended in 1989. Park dwellers, along with the larger population of households displaced during the construction of the Mahaweli irrigation system, were given preference for free AMDP lands. Each resettled household received one hectare of paddy land and 0.2 hectares on which to build a homestead.

However, the size of the land allocations appears too small to sustain more than one farming generation. Resettled households report that their maturing children are increasingly unable to make a livelihood from paddy cultivation or to find local off-farm employment. As AMDP households grow, their need for land creates new pressures to return to illegal encroachment of protected areas. Park demarcation and habitat fragmentation has had a slightly negative impact on households bordering the park. To avoid drawing more settlers into these areas, the Sri Lankan Government provides few social services and little infrastructure. Households at the southern boundary of the Maduru Oya Park reported little to no social services or private transport. And opportunities from tourism for example, as guides or artisans have yet to emerge. These households are also adversely affected when elephants roam onto their land, trampling their crops and dwellings. The danger of

roaming wildlife is such a constant problem that nearly every household in the buffer zone of the park's southern border has a special perch for spotting and driving away marauding elephants and wild boars.

Program Sustainability

The survival of many wildlife species in the Mahaweli system is unlikely unless degraded forest habitats are helped with regeneration and habitats are consolidated and linked into biologically viable units. The small size, degraded conditions, and isolation of Sri Lanka's current protected areas increase the likelihood that many endangered animal populations may fall below levels necessary to maintain genetic diversity for species survival. The extinction of many of Sri Lanka's prized wildlife species the Asian wild elephant, predator cats, migratory ruminants, some predatory birds is increasingly probable. Frequent animal-human conflicts in areas bordering Sri Lanka's forest parks will only hasten the process.

The sustainability of government programs for forest habitat protection is doubtful until regulatory and enforcement functions are balanced with more effective conservation planning and management both inside and outside AMDP parks and sanctuaries. Mahaweli protected area system development has bought time but has not guaranteed a secure future for the area's newly demarcated protected areas. Irrigated land allocations have absorbed pressures for further clearing of forests for cultivation. Also, trees cleared from the irrigation schemes have provided a cheap supply of fuelwood that temporarily has further reduced the need for cutting trees in remaining habitats.

But with population pressures continuing to build in the Mahaweli scheme and only a small fraction of demand for fuelwood and forest products being met from commercial or community tree farming, Sri Lanka's forest habitats will again be looked to as sources of income and livelihood. Accompanying political pressures will build to draw further on the country's remaining forests for settlement, particularly in corridors between habitats.

Moreover, many threats to forest habitat protection lie in areas outside DWLC's jurisdiction. Coordination among other agencies is therefore critical to successful protection measures. But DWLC and MASL responsibilities in AMDP are neither clear nor easily made operational. For example, there is little evidence of coordination between the two in addressing animal-human conflicts, long-term fuelwood demand and supply, or the unregulated use of pesticides and agrochemicals on irrigated rice fields contiguous to park lands. Protected area management remains vulnerable to political influence and bureaucratic disarray, and little has been done to mobilize political support for habitat protection.

To help the Government of Sri Lanka overcome some of these constraints, USAID is now emphasizing the role of NGOs in creating public awareness of environmental issues. There are several Sri Lankan NGOs capable of playing an active role in mobilizing public

opinion on national environmental concerns and in assisting the Government in coordinated efforts to enhance the sustainability of Sri Lanka's forest habitat system.

Lessons Learned

Programs for setting aside forested areas for wildlife conservation must address the habitat size and quality requirements of resident wildlife species. In some settings, the mix of wildlife species may dictate fewer but larger contiguous areas to ensure species survival and avoid human-animal conflicts. Each protected habitat needs to be managed as part of a national system following a land-use strategy that allows for variations in human activities (e.g., tourism, recreation, no entry) depending on the stage of habitat and wildlife regeneration.

Protecting Sri Lanka's biological diversity requires interagency coordination to address both internal and external forces at play. Sri Lanka has in place strong environmental policies and legislation establishing a Central Environmental Authority, numerous national parks and wildlife sanctuaries, soil and forest conservation, land use, and assessment of environmental impacts for new development proposals. However, such policies are not consistently translated into sound natural resource management practices. Policy implementation is assigned across several government agencies, without well-defined responsibilities. Improved coordination among agencies will help them plan and manage resource use with an understanding of the integrated nature of AMDP ecological systems.

Insulation of environmental trusts or foundations from political manipulation is necessary to avoid decision-making that steers them away from their intended goals. Environmental trusts represent a promising alternative to traditional government control and regulation of environmental issues. Experience in Sri Lanka, however, suggests that creating a trust is not enough. Control and direction must also be arranged in a manner that protects the trust from undue political influence or poor decision-making. Only by being free of government financial support and bureaucratic control can a trust exercise independence in shaping its strategies and carrying out its programs.

This Evaluation Highlights was prepared by Phillip Church of the Center for Development Information and Evaluation. It summarizes the findings from the USAID Working Paper "Protecting Biological Diversity: Sri Lanka Case Study," by Nora Berwick, Phillip Church, and Steven Gale. The study is part of a six-country assessment, directed by Phillip Church, of USAID's biological diversity protection programs. Readers can order copies of CDIE reports from the DISC, 1611 North Kent Street, Suite 200, Arlington, VA 22209-2111, telephone (703) 351-4006; fax (703) 351-4039.